Music Therapy is Associated with Family Perception of More Spiritual Support and Decreased Breathing Problems in Cancer Patients receiving Hospice Care

Debra S. Burns, PhD, MT-BC[1,3]

Susan M. Perkins, PhD[2,3]

Yan Tong, MS[2]

Russell E. Hilliard, PhD, LCSW, MT-BC[4]

Larry D. Cripe, MD[2,3]

[1]School of Engineering and Technology @ IUPUI, Indianapolis, IN USA
[2]Indiana University School of Medicine, Indianapolis IN, USA
[3]Indiana University Melvin and Bren Simon Cancer Center, Indianapolis, IN USA
[4]Seasons Hospice & Palliative Care, Des Plaines IL USA

Corresponding author: Debra S. Burns desburns@iupui.edu
Dept. of Music and Arts Technology
School of Engineering and Technology @ IUPUI
535 W. Michigan St., IT 391
Indianapolis, IN 46202
317-278-2014

Tables: 3
References: 29
Word Count: 3183

This is the author's manuscript of the article published in final edited form as:

Burns, D. S., Perkins, S. M., Tong, Y., Hilliard, R. E., & Cripe, L. D. (2015). Music Therapy Is Associated With Family Perception of More Spiritual Support and Decreased Breathing Problems in Cancer Patients Receiving Hospice Care. J*ournal of Pain and Symptom Management, 50*(2), 225–231. http://doi.org/10.1016/j.jpainsymman.2015.02.022

Abstract

Context: Music therapy is a common discretionary service offered within hospice; however, there are critical gaps in understanding the effects of music therapy on hospice quality indicators, such as family satisfaction with care. **Objectives**: The purpose of this study was to examine whether music therapy affected family perception of patients' symptoms and family satisfaction with hospice care. **Methods**: A retrospective, cross sectional analysis of electronic medical records from 10,534 cancer patients cared for between 2006-2010 by a large national hospice. Logistic regression was used to estimate the effect of music therapy using propensity scores to adjust for non-random assignment. **Results:** Overall, those receiving music therapy had higher odds of being female, having longer length of stay, and receiving more services other than music therapy, and lower odds of being married/partnered or receiving home care. Family satisfaction data were available for 1495 (14%) and were more likely available if the patient received music therapy (16% vs 12%, $p<.01$). There were no differences in patient pain, anxiety, or overall satisfaction with care between those receiving music therapy vs not. Patients who received music therapy were more likely to report discussions about spirituality (OR=1.59, p=.01), marginally less trouble breathing (OR = 0.77, p=.06), and marginally more likely to receive the right amount of spiritual support (OR = 1.59, p=.06). **Conclusions:** Music therapy was associated with perceptions of meaningful spiritual support and less trouble breathing. The results provide preliminary data for a prospective trial to optimize MT interventions for integration into clinical practice.
Keywords (3-10): Music Therapy; Hospice Care; Propensity Score Analysis; Family Satisfaction

Introduction

Survey results from randomly selected hospices in the US estimate that music therapy is a discretionary service provided by over half of the hospices nationwide.[1,2] According to the Certification Board of Music Therapy, approximately 430 music therapists provide services to hospice patients.[3] Hospices who offer music therapy as a discretionary service report that it is a patient-preferred therapy compared to other complementary modalities.[4] Patients expect multiple benefits from music therapy, including emotional and spiritual support, support coping with pain, and an opportunity to express feelings.[5]

Emotional distress, pain management, and attention to spiritual needs are critical to high quality end of life care.[6-8] Despite widespread use of music therapy in hospice care, empirical evidence of benefit is sparse. Systematic reviews summarizing the available quantitative evidence for music therapy in hospice and cancer care arrive at similar conclusions: preliminary evidence from small scale studies included in reviews suggests music therapy interventions may be beneficial in decreasing patient-perceived anxiety and pain and improving quality of life.[7,9-11] Studies published after the most recent reviews as well as interpretive research provide further support that music therapy improves quality of life, specifically in terms of psychophysiological issues such as anxiety, pain, and shortness of breath as well as spirituality.[12-15] Interpretive research describes patients and families experience music and music therapy as providing ways to remain connected to self and others, a means for expression, and a way to stimulate reminiscence and life review.[16-18]

Because of the important role of family members in the care of the dying, family satisfaction is also seen as an important component of quality end of life care.[6,19] While preliminary evidence supports the patient related outcomes of quality end of life care, the influence of music therapy on family perception of quality of care is not known. The purpose of this analysis was to explore the influence of music therapy on family perception of management of patient symptoms and family satisfaction with hospice care in cancer patients. Results of the analysis may identify outcomes for further study and guide current practice.

Methods

Study Population and Data Sources

Overview. This retrospective, cross-sectional study included merged data from two sources: electronic medical records (EMR) and family satisfaction (FEHC) data collected 1-3 months post-death. Both data sources originated from patients and families cared for by a national hospice that, at the time of data extraction, had divisions in 13 states nation-wide. The hospice uses a web-based, point of care electronic medical record system that is housed in a single location allowing for automatic integration of data from all clinical sites. The final analysis dataset included patient- and division-level variables that may predict receipt of music therapy services and relate to hospice quality indicators (See Tables 1 & 2).[20]

The National Hospice and Palliative Care Organization's Family Evaluation of Hospice Care (FEHC) survey was developed to explore whether end of life care met the family's perceived needs of the dying patient and family satisfaction with overall hospice care.[21] Specifically, the 61-item survey asks about the family members' perspectives of the provision of physical, emotional, and spiritual comfort to the dying person, attention to informational needs and family support, coordination of care, and overall satisfaction.[21] For the purpose of this study, we analyzed the items focused on provision of physical (pain, dyspnea), emotional (anxiety), and spiritual comfort to the patient and overall satisfaction.

This study was approved by the Indiana University-Purdue University-Indianapolis Institutional Review Board. Patients consenting for hospice care sign an admission form that includes consent for treatment, explanation of advanced directives, patient's rights and responsibilities, and a release of information of privacy practices. The privacy practices material informs patients that health information may be used for research purposes. Extracted data were collected between January 1, 2006 and December 31, 2010 on 29,284 hospice decedents who were aged 18 or older. Records were excluded if the patient was still alive on January 1, 2011 or if death occurred prior to completion of hospice admission.

Sample. A cohort of cancer patients within a larger dataset were identified using the ICD-9 code as the primary diagnosis on the hospice admission form. The sample included n=10,534 patients with a primary hospice diagnosis of cancer from the electronic medical record system who were admitted for care between January 1, 2006 and December 31, 2010. Patients represented fourteen divisions although only twelve are represented in the model-based results since volunteer hour reports for two newly opened divisions had not submitted volunteer data to the managing data center.

Analysis

All models below included a random effect for division to account for the clustering of patients within divisions. Simple descriptive measures were tabulated for those that received music therapy and those that did not. We first used multi-level logistic regression models to model whether or not the patient received music therapy services or not as a function of patient-level predictors (each variable considered univariately) controlling for division-level variables. Similarly, we examined each division-level variable univariately controlling for patient-level variables. Second, we fit a single multi-level logistic regression model that included all patient and division-level covariates simultaneously. This model allowed us to explore what factors were independent predictors of receiving music therapy and at the same time allowed the estimation of the propensity score (the probably of receiving music therapy services or not) for each patient to use as a covariate when estimating the effect of music therapy services on family satisfaction. Finally, the effect of music therapy was estimated by modeling each family satisfaction outcome using a logistic model that included a main effect for music therapy services received (yes/no) and the propensity scores as a covariate. Using the propensity score as a covariate served to reduce the bias in estimating the music therapy effect created by the non-random assignment to receive music therapy services or not. We also used logistic regression models to determine which patient-level factors were associated with having or not having family satisfaction data.

Results

Sample Description - Receipt of Music Therapy

3,936 of 10,534 (37.36%) cancer patients received music therapy services from January 1, 2006 to December 31, 2010. There were a total of 4,134 music therapy sessions delivered averaging 2 visits/patient and 1.3 hour/session. Demographic information and differences between patients receiving music therapy versus those not receiving music therapy are in detailed Table 1a. Only the results from the multivariable model are reported since the results were consistent with the univariate models. Although almost all differences were statistically significant due to the large sample sizes, large differences (e.g. greater than 5% differences for categorical variables) were seen in gender, marital status, location of hospice care, length of stay, and receiving services from a hospice aid, physician, social worker, or chaplain. Those

receiving MT had higher odds of being female, having longer length of stay, and receiving more services other than MT, and lower odds of being married/partnered or receiving home care. When we examined division-level predictors controlling for patient characteristics (Table 1b), only volunteer hours was significant, with higher average volunteer hours associated with greater odds of receiving music therapy.

Table 1a: Patient Characteristics by Receipt of Music Therapy

	Patients Receiving Music Therapy		**Overall p-value**	**OR[a] (95% CI)**	**P**
	Yes (n= 3936)	No (n = 6598)			
Patient Level Variables					
Age (years), mean ± std	70.57 ± 14.76	69.04 ± 13.88	0.5947	1.001 (0.997,1.005)	0.5947
Gender, Number (%)			0.0008		
Female (ref.)	2233 (56.73)	3186 (48.29)			
Male	1700 (43.19)	3407 (51.64)		0.775 (0.691,0.868)	0.0002
Unknown	3 (0.08)	5 (0.08)		1.732 (0.325,9.224)	0.4965
Race/Ethnicity, Number (%)			0.0508		
Caucasian (ref.)	2277 (57.85)	3909 (59.25)			
African American	1015 (25.79)	1629 (24.69)		0.877 (0.779,0.987)	0.0305
Asian	61 (1.55)	142 (2.15)		0.631 (0.442,0.903)	0.0128
Hispanic	185 (4.70)	288 (4.36)		1.072 (0.846,1.358)	0.5587
Other	103 (2.62)	135 (2.05)		1.011 (0.744,1.375)	0.9407
Undefined	295 (7.49)	495 (7.50)		0.971 (0.803,1.173)	0.2515
Marital Status, Number (%)			0.0296		
Married/Partnered (ref.)	1348 (34.25)	2907 (44.06)			
Divorced/Separated	1049 (26.65)	1499 (22.72)		1.172 (1.032,1.332)	0.0163
Widowed	1061 (26.96)	1465 (22.20)		1.170 (1.020,1.342)	0.0261
Unknown	478 (12.14)	727 (11.02)		1.004 (0.849,1.187)	0.9660
Caregiver status, Number (%)			0.2096		
Having a primary caregiver	1524 (38.72)	2556 (38.74)		1.088 (0.969,1.222)	0.1363

No primary caregiver (ref.)	2412 (61.28)	4042 (61.26)			
Cancer diagnosis, Number (%)			0.0695		
Head and neck	117 (2.97)	212 (3.21)		1.544 (0.587,4.062)	0.3750
Gastroesophageal	182 (4.62)	393 (5.96)		1.435 (0.554,3.719)	0.4529
Colorectal	450 (11.43)	702 (10.64)		1.605 (0.627,4.108)	0.3200
Pancreatic/hepatobiliary	324 (8.23)	613 (9.29)		1.519 (0.592,3.897)	0.3807
Lung	1013 (25.74)	1919 (29.08)		1.487 (0.585,3.782)	0.4007
Breast/Gynecological	614 (15.60)	791 (11.99)		1.759 (0.688,4.496)	0.2351
Genitourinary	429 (10.90)	615 (9.32)		1.962 (0.765,5.030)	0.1587
Hematological	387 (9.83)	688 (10.43)		1.732 (0.676,4.438)	0.2490
Malignancy NOS	399 (10.14)	632 (9.58)		1.672 (0.652,4.285)	0.2813
Uncomfirmed (ref.)	21 (0.53)	33 (0.50)			
Location of hospice care			<0.0001		
Home (ref.)	1774 (45.28)	3869 (58.96)			
Hospital	375 (9.57)	771 (11.75)		1.704 (1.462,2.071)	<0.0001
Others	1769 (45.15)	1922 (29.29)		1.815 (1.618,2.035)	<0.0001
Length of stay (days), Median (25th, 75th percentile)	19 (8, 49)	7 (3, 23)	<0.0001	1.003 (1.002,1.004)	<0.0001
Number of disciplines involved in patient care, Median (25th, 75th percentile)	4 (3, 4)	3 (2, 3)	<0.0001	1.029 (0.753,1.406)	0.8597
Hospice aid, Number (%)			<0.0001		
Yes	3199 (81.28)	3742 (56.71)		2.052 (1.408,2.992)	0.0015
No (ref.)	737 (18.72)	2856 (43.29)			
Hospice physician, Number (%)			<.0001		

Yes	636 (16.16)	370 (5.61)		2.073 (1.356,3.171)	0.0042
No (ref.)	3300 (83.84)	6228 (94.39)			
Skilled Nursing			0.0129		
Yes	3928 (99.80)	6522 (98.85)		1.080 (0.327,3.568)	0.8663
No (ref.)	8 (0.20)	76 (1.15)			
Social work			<0.0001		
Yes	3708 (94.21)	4887 (74.07)		2.835 (1.888,4.257)	0.0002
No (ref.)	228 (5.79)	1711 (25.93)			
Chaplain			<0.0001		
Yes	2862 (72.71)	2286 (34.65)		3.189 (2.223,4.574)	<0.0001
No (ref.)	1074 (27.29)	4312 (65.35)			

[a]Odds ratio (OR) estimated from multivariable model. An OR > 1 indicates higher odds of receiving MT. An odds ratio < 1 indicates lower odds of receiving MT.

Table 1b: Relationship of Division-Level Factors to Receiving Music Therapy

Factor	Odds[a] Ratio	95% CI	p-value
Length of Time Division Open	0.923	(0.744,1.145)	0.4091
Median LOS	1.015	(0.990,1.041)	0.2029
Average Daily Census	0.009	(0.993,1.006)	0.8453
Average Volunteer Hours	3.514	(1.224,10.091)	0.0259

[a]Odds ratio (OR) estimated from multivariable model. An OR > 1 indicates higher odds of receiving MT. An odds ratio < 1 indicates lower odds of receiving MT.

Family Evaluation of Hospice Care

1495 of 10,534 cancer patients (14%) had evaluable family satisfaction data available. Data were more likely available if the patient had received music therapy services (16% vs 12%, p<.01). In addition, those having FEHC data, decedents were more likely to be older (74 years vs 69 years, p < 0.0001), Caucasian (74% vs 56%, p < 0.0001), married/partnered (49% vs 39%, p < 0.0001), receive hospice care at home (71% vs 51%, p < 0.0001), have longer length of stay (median 15 days vs 11 days, p = .0014), and receive care from a hospice aid (71% vs 65%, p < 0.0001) or social worker (90% vs 80%, p < 0.0001).

Family Member Ratings of Hospice Care

There were no differences in family reports of pain or anxiety/sadness between those patients who received music therapy versus those who did not (See Table 2). There were differences in family perception regarding the amount of contact concerning religious and/or spiritual beliefs if the patient received music therapy (OR 1.59, 95% CI: 1.13 – 2.22, p=0.012).

Although not reaching the level of statistical significance, those receiving music therapy reported lower odds of having trouble breathing (OR 0.77, 95% CI: 0.58- 1.02, p = .062) and higher odds of receiving the right amount of spiritual contact prior to patient death (OR 1.59, 95% CI: 0.98 – 2.58, p = .061).

Table 2 Difference in FEHC depending on receiving music therapy

			Unadjusted OR[a] estimate		Adjusted OR[a] estimate	
	Yes	No	OR (CI)	p	OR (CI)	p
Pt. had pain:						
Yes	582 (92.97)	762 (92.14)	1.12		1.07	
No	44 (7.03)	65 (7.86)	(.72, 1.75)	0.5879	(0.63-1.81)	0.781
MEDAMOUNT[b]:						
The right amount	517 (92.32)	684 (93.32)	0.85		0.85	
Others	43 (7.68)	49 (6.68)	(0.52, 1.37)	0.4548	(0.48, 1.49)	0.526
Trouble breathing:						
Yes	313 (51.23)	453 (56.00)	0.83		0.77	
No	298 (48.77)	356 (44.00)	(0.65, 1.05)	0.102	(0.58, 1.02)	0.062
BRTHHELP[b]:						
The right amount	281 (93.05)	411 (91.74)	1.18		0.88	
Others	21 (6.95)	37 (8.26)	(.63, 2.21)	0.5847	(0.42, 1.83)	0.706
Pt. was anxious:						
Yes	341 (56.93)	430 (54.50)	1.11		0.91	
No	258 (43.07)	359 (45.50)	(0.88, 1.42)	0.345	(0.68, 1.20)	0.459
ANXHELP[b]:						
The right amount	283 (85.76)	345 (83.33)	1.21		1.31	
Others	47 (14.24)	69 (16.67)	(0.76, 1.91)	0.3841	(0.77, 2.24)	0.282
Hospice discussed spirituality:						
Yes	502 (82.30)	592 (72.11)	1.77		1.59	
No	108 (17.70)	229 (27.89)	(1.32, 2.36)	0.001	(1.13, 2.22)	0.012
Right amount of spiritual contact:						
Yes	571 (95.33)	751 (93.76)	1.29		1.35	
No	28 (4.67)	50 (6.24)	(0.75, 2.21)	0.320	(0.73, 2.50)	0.307
Spiritual contact prior to death:						
The right amount	573 (92.27)	734 (89.51)	1.40		1.59	
Others	48 (7.73)	86 (10.49)	(0.92, 2.11)	0.105	(0.98, 2.58)	0.061
Spiritual contact after death:						
The right amount	534 (86.27)	711 (87.67)	0.87		0.85	
Others	85 (13.73)	100 (12.33)	(0.61, 1.23)	0.393	(0.57, 1.28)	0.408
Overall quality of care:						
Excellent	429 (68.20)	532 (63.56)	1.19		1.17	
Others	200 (31.80)	305 (36.44)	(0.93, 1.53)	0.153	(0.88, 1.56)	0.251
Recommend this hospice to others:						
Yes	602 (95.86)	795 (94.98)	1.22		1.25	
No	26 (4.14)	42 (5.02)	(0.70,2.14)	0.449	(0.65, 2.40)	0.468

[a]An odds ratio (OR) > 1 indicates higher odds of those with MT responding 'yes', 'the right amount' or Excellent' vs those that don't receive MT. An odds ratio < 1 indicates lower odds of those with MT responding 'yes', 'the right amount' or Excellent'

[b]Question only asked of those who responded 'yes' to prior question.

Discussion

Music therapy is the clinical and evidence-based use of interactive or receptive music interventions within a therapeutic relationship by a board-certified music therapist (MT-BC) to address clinical goals such as symptom relief, distress management, and provide patient/family support.[22] The number of hospices providing music therapy has increased over the past 15 years, but it is unclear how well music therapy services are integrated into care. Additionally, there are no fully powered studies exploring the influence of hospice music therapy on patient outcomes or family satisfaction. This report is the first to examine the delivery of music therapy within a large hospice and explore the potential link between music therapy and family satisfaction. Results provide insights into the delivery of hospice music therapy services for cancer patients and identify potential areas for study.

Overall, approximately 40% of the cancer patients within this dataset received music therapy as part of their hospice care. Patients who had a shorter length of stay had a lower probability of receiving music therapy, which may be related to patient acuity at the time of hospice admission or difficulty scheduling music therapy following admission and prior to death. A report describing referral trends in Australian community palliative care and inpatient programs reported that the average time to a music therapy referral was 11 days, which is longer than the median length of stay of the patients who did not receive music therapy within the current dataset.[23] Furthermore, patients in the Australian study were more likely referred as their ECOG (Eastern Cooperative Oncology Group) rating became worse, indicating a reactive referral pattern. Meta-analyses of medical music therapy research indicates that if pain is a predictable symptom of the disease process, the earlier the music intervention, the better the outcome.[24]

There were no differences in family perception of patient anxiety or pain based on the receipt of music therapy. Anxiety and pain are common reasons for referral to music therapy; however, research supporting the use of music therapy to decrease anxiety and pain is equivocal.[7,9,10,25] Improvisation, songwriting, and pairing live or recorded music with imagery experiences are examples of common interventions used by hospice music therapists.[26] These interventions are differentially effective when targeting anxiety and stress related outcomes.[27] However, because many music-based studies do not identify theoretical frameworks to guide intervention choice, it is unclear which types of interventions are most effective under a given set of circumstances.[25] While not available in this dataset, documentation describing clinical decision-making and implemented interventions in future prospective trials may better refine music therapy practice.

Family members reported less dyspnea, higher likelihood of discussions surrounding spiritual beliefs along with adequate spiritual support depending on the receipt of music therapy services. There are few studies exploring the use of music therapy to decrease dyspnea or breathing difficulties in cancer patients. Two studies explored the use of a music intervention to decrease breathlessness in advanced cancer patients with equivocal results;[12,2813,26] however, both studies had multiple methodological weaknesses including small sample sizes and a lack of a comparison condition which prohibit generalization. The results from the current analysis suggest that the use of music-based interventions to manage dyspnea could be examined further.

Spirituality is a common need music therapists address when working with cancer patients in active treatment and patients receiving hospice care. The use of religious and spiritual music during hospice music therapy interventions is common and likely contributed to this outcome.[26] Experimental studies on music therapy and spirituality are sparse, although one study reported positive changes in spiritual well-being after music therapy compared to an attention-control condition.[14] Qualitative reports and case studies describe a vast range of

spiritual experiences in hospice music therapy that are highly individualized in terms of music used and intervention intent (e.g. religious, meaning making, and existential).[29]

There were no differences in overall satisfaction with care dependent on the receipt of music therapy. This is consistent with a previous study exploring the influence of music therapy on medical inpatients' overall satisfaction.[30] The measurement of satisfaction with hospice care is completed by family members, which may be biased based on the family member's needs and the latent, retrospective nature of the measures (i.e., 1-3 months post death).[8] Family ratings of satisfaction for hospice care are related to information about the family member's condition and medical treatment, the provision of adequate emotional support to the family member, and an identifiable nurse in charge of care.[8] It is likely that the current standard measure of overall satisfaction with hospice care is too broad and influence by multiple aspects of hospice care to capture the specific patient-related benefits (i.e. breathlessness, spirituality) of music therapy.

Study Limitations

There are several limitations of the current study. The overall response rate for the FEHC was low, which may indicate a response bias and raising concerns about the representativeness of the sample. In addition to the low FEHC response rate, families who received music therapy services were more likely to return satisfaction surveys, indicating potential response bias. Furthermore, propensity score analysis controls for known potential differences which may influence outcomes, but not unknown differences that would be controlled for with random assignment. This leads to the possibility that there are other differences between the groups for which propensity score analysis did not control. Second, patients who received music therapy services received more services overall, especially from hospice aids, social workers and chaplains. Some of the positive ratings in family satisfaction data may be due to the synergistic nature of multiple professionals and para-professionals addressing the needs of patients and their families.[31]

To our knowledge, this is the first study to link the receipt of music therapy to family satisfaction with care, specifically in hospice. The results indicate potential directions for prospective trials in music therapy and hospice. Specifically, our results suggest that there may be potential benefits from the integration of music therapy services within hospice care in terms of providing spiritual support and relieving dyspnea in patients receiving hospice care. Exploring collaborations between pastoral care and music therapy in providing spiritual support may assist in optimizing valuable hospice resources. The intentional examination of music-based interventions in reducing dyspnea is also warranted. Given the equivocal results of pain and anxiety trials, studies examining the benefits of theoretically derived music interventions targeting these outcomes are also needed to guide music therapy clinical practice within hospice.

Disclosures

None.

Acknowledgements

This project received support from the Mary Margaret Walther Program in Palliative Care Research and Education, Indiana University Bren and Simon Cancer Center (Burns, PI).

References

1. Bercovitz A, Sengupta M, Jones A, Harris-Kojetin LD. Complementary and alternative therapies in hospice: The National Home and Hospice Care Survey: United States, 2007. *National Health Statistics Report.* 2011;33(January):1-20.
2. Demmer C. A survey of complementary therapy services provided by hospices. *J Palliat Med.* 2004;7(4):510-516.
3. The Certification Board for Music Therapists. Number of music therapists working in hospice. In: Burns DS, ed. Downingtown, PA2015.
4. Running A, Shreffler-Grant J, Andrews W. A survey of hospices use of complementary therapy. *J Hosp Palliat Nurs.* 2008;10(5):304-312.
5. Bruscia K, Dileo C, Shultis C, Dennery K. Expectations of hospitalized cancer and cardiac patients regarding the medical and psychotherapeutic benefits of music therapy. *Art Psychother.* 2009;36(4):239-244.
6. IOM (Institute of Medicine). *Dying in America: Improving quality and honoring individual preferences near the end of life.* Washington, DC2014.
7. Bowers TA, Wetsel MA. Utilization of music therapy in palliative and hospice care An integrative review. *Journal of Hospice & Palliative Nursing.* 2014;16(4):231-239.
8. Aspinal F, Addington-Hall J, Hughes R, Higginson IJ. Using satisfaction to measure the quality of palliative care: a review of the literature. *Journal of Advanced Nursing.* 2003;42(4):324-339.
9. Bradt J, Dileo C. Music therapy for end-of-life care. *Cochrane Database Syst Rev.* 2010(1):CD007169.
10. Bradt J, Dileo C, Grocke D, Magill L. Music interventions for improving psychological and physical outcomes in cancer patients. *Cochrane Db Syst Rev.* 2011(8):CD006911.
11. Archie P, Bruera E, Cohen L. Music-based interventions in palliative cancer care: a review of quantitative studies and neurobiological literature. *Support Care Cancer.* 2013;21(9):2609-2624.
12. Horne-Thompson A, Grocke D. The effect of music therapy on anxiety in patients who are terminally ill. *J Palliat Med.* 2008;11(4):582-590.
13. Hilliard RE. The effects of music therapy on the quality and length of life of people diagnosed with terminal cancer. *Journal of Music Therapy.* 2003;40(2):113-137.
14. Wlodarczyk N. The effect of music therapy on the spirituality of persons in an in-patient hospice unit as measured by self-report. *Journal of Music Therapy.* 2007;44(2):113-122.
15. Gutgsell KJ, Schluchter M, Margevicius S, et al. Music Therapy Reduces Pain in Palliative Care Patients: A Randomized Controlled Trial. *J Pain Symptom Manage.* 2012.
16. Clements-Cortes A. The use of music in facilitating emotional expression in the terminally ill. *Am J Hosp Palliat Care.* 2004;21(4):255-260.
17. O'Callaghan C, McDermott F. Music therapy's relevance in a cancer hospital researched through a constructivist lens. *Journal of Music Therapy.* 2004;41:151-185.
18. O'Callaghan CC, McDermott F, Michael N, Daveson BA, Hudson PL, Zalcberg JR. "A quiet still voice that just touches": music's relevance for adults living with life-threatening cancer diagnoses. *Support Care Cancer.* 2014;22(4):1037-1047.
19. Teno JM, Casey VA, Welch LC, Edgman-Levitan S. Patient-focused, family-centered end-of-life medical care: views of the guidelines and bereaved family members. *J Pain Symptom Manage.* 2001;22(3):738-751.
20. Andersen RM. National health surveys and the behavioral model of health services use. *Med Care.* 2008;46(7):647-653.
21. Connor SR, Teno J, Spence C, Smith N. Family evaluation of hospice care: results from voluntary submission of data via website. *J Pain Symptom Manage.* 2005;30(1):9-17.

22. American Music Therapy Association. What is Music Therapy? 2013; http://www.musictherapy.org/about/quotes/. Accessed October 13, 2014.
23. Horne-Thompson A, Daveson B, Hogan B. A project investigating music therapy referral trends within palliative care: an Australian perspective. *Journal of Music Therapy.* 2007;44(2):139-155.
24. Standley JM. Music research in medical treatment. In: Smith DS, ed. *Effectiveness of Music Therapy Procedures: Documentation of Research and Clinical Practice*. 3rd ed. Silver Springs, MD: American Music Therapy Association; 2000:1-64.
25. Burns DS. Theoretical rationale for music selection in oncology intervention research: An integrative review. *Journal of Music Therapy.* 2012;49(1):7-22.
26. Pierce J. *Hospice Music Therapy Song Repertoire and Music Therapy Techniques*. Tallahassee: College of Music Florida State University; 2011.
27. Pelletier CL. The effect of music on decreasing arousal due to stress: a meta-analysis. *Journal of Music Therapy.* 2004;41(3):192-214.
28. Lai WS, Chao CS, Yang WP, Chen CH. Efficacy of guided imagery with theta music for advanced cancer patients with dyspnea: a pilot study. *Biol Res Nurs.* 2010;12(2):188-197.
29. Kidwell MD. Music therapy and spirituality: How can I keep from singing? *Music Therapy Perspectives.* 2014.
30. Mandel SE, Davis BA, Secic M. Effects of music therapy on patient satisfaction and health-related quality of life of hospital inpatients. *Hosp Top.* 2014;92(2):28-35.
31. O'Kelly J, Koffman J. Multidisciplinary perspectives of music therapy in adult palliative care. *Palliat Med.* 2007;21(3):235-241.